

```

234 leCysValPheIlePheAlaPheIleMetProIleLeuIleIleThrVal 250
|||||
910 TCTGTGTCTTTATCTTCGCTTTCATCATGCCGATCCTCATCACTGTG 959

251 CysTyrGlyLeuMetIleLeuArgLeuLysSerValArgMetLeuSerGl 267
|||||
960 TGTTACGGCCTGATGATCTTACGACTCAAGAGCGTTCGCATGCTATCGGG 1009

267 ySerLysGluLysAspArgAsnLeuArgArgIleThrArgMetValLeuV 284
|||||
1010 CTCAAAGAAAAGGACAGGAATCTGCGCAGGATCACCCGGATGGTGCTGG 1059

284 alValValAlaValPheIleValCysTrpThrProIleHisIleTyrVal 300
|||||
1060 TGGTCGTGGCTGTATTTATCGTCTGCTGGACCCCATCCACATCTACGTC 1109
301 IleIleLysAlaLeuIleThrIleProGluThrThrPheGlnThrValSe 317
|||||
1110 ATCATCAAAGCGCTGATCACGATTCCAGAAACCACATTTTCAGACCGTTTC 1159

317 rTrpHisPheCysIleAlaLeuGlyTyrThrAsnSerCysLeuAsnProV 334
|||||
1160 CTGGCACTTCTGCATTGCTTTGGGTTACACGAACAGCTGCCTGAATCCAG 1209

334 alLeuTyrAlaPheLeuAspGluAsnPheLysArgCysPheArgGluPhe 350
|||||
1210 TTCTTTACGCCTTCCTGGATGAAAACCTCAAGCGATGCTTCAGAGAGTTC 1259

351 CysIleProThrSerSerThrIleGluGlnGlnAsnSerThrArgValAr 367
|||||
1260 TGCATCCCAACCTCGTCCACGATCGAACAGCAAACTCCACTCGAGTCCG 1309

367 gGlnAsnThrArgGluHisProSerThrAlaAsnThrValAspArgThrA 384
|||||
1310 TCAGAACTAGGGAACATCCCTCCACGGCTAATACAGTGGATCGAACTA 1359

384 snHisGlnLeuGluAsnLeuGluAlaGluThrAlaProLeuPro 398
|||||
1360 ACCACCAGCTAGAAAATCTGGAGGCAGAACTGCTCCATTGCC 1403

```

SEQ ID NO: 2

RESULT 1

I56517

mu opioid receptor - rat

C;Species: Rattus norvegicus (Norway rat)

C;Date: 26-Jul-1996 #sequence_revision 26-Jul-1996 #text_change 20-Jun-2000

C;Accession: I56517; I57951; A49680; I52314; S34593; A48799; I58154

R;Bunzow, J.R.; Zhang, G.; Bouvier, C.; Saez, C.; Ronnekleiv, O.K.; Kelly, M.J.; Grandy, D.K.

J. Neurochem. 64, 14-24, 1995

A;Title: Characterization and distribution of a cloned rat mu-opioid receptor.

A;Reference number: I56517; MUID:95096825

A;Accession: I56517

A;Status: preliminary; translated from GB/EMBL/DDBJ

A;Molecule type: mRNA

A;Residues: 1-398 <RES>

Sequence
Comparison A

A;Cross-references: EMBL:U02083; NID:g403573; PIDN:AAA70049.1; PID:g403574
 R;Chen, Y.; Mestek, A.; Liu, J.; Hurley, J.A.; Yu, L.
 Mol. Pharmacol. 44, 8-12, 1993
 A;Title: Molecular cloning and functional expression of a mu-opioid receptor from rat brain.
 A;Reference number: I57951; MUID:93341493 July
 A;Accession: I57951
 A;Status: preliminary; translated from GB/EMBL/DDBJ
 A;Molecule type: mRNA
 A;Residues: 1-398 <RE2>
 A;Cross-references: GB:L13069; NID:g348250; PIDN:AAA41630.1; PID:g348251
 R;Eppler, C.M.; Hulmes, J.D.; Wang, J.B.; Johnson, B.; Corbett, M.; Luthin, D.R.; Uhl, G.R.; Linden, J.
 J. Biol. Chem. 268, 26447-26451, 1993
 A;Title: Purification and partial amino acid sequence of a mu opioid receptor from rat brain.
 A;Reference number: A49680; MUID:94075333
 A;Accession: A49680
 A;Status: preliminary
 A;Molecule type: protein
 A;Residues: 272-291 <EPP>
 A;Experimental source: brain membranes
 A;Note: sequence extracted from NCBI backbone (NCBIP:140841)
 R;Sedqi, M.; Roy, S.; Ramakrishnan, S.; Elde, R.; Loh, H.H.
 Biochem. Biophys. Res. Commun. 209, 563-574, 1995
 A;Title: Complementary DNA cloning of a mu-opioid receptor from rat peritoneal macrophages.
 A;Reference number: I52314; MUID:95251654
 A;Accession: I52314
 A;Status: preliminary
 A;Molecule type: mRNA
 A;Residues: 101-340 <SED>
 A;Cross-references: GB:S77863; NID:g998526
 A;Experimental source: Sprague Dawley, peritoneal macrophages
 R;Fukuda, K.; Kato, S.; Mori, K.; Nishi, M.; Takeshima, H.
 FEBS Lett. 327, 311-314, 1993 Aug 2
 A;Title: Primary structures and expression from cDNAs of rat opioid receptor delta- and mu-subtypes.
 A;Reference number: S34592; MUID:93351652
 A;Accession: S34593
 A;Molecule type: mRNA
 A;Residues: 1-244,'V',246-398 <FUK>
 A;Cross-references: GB:D16349; NID:g391866; PIDN:BAA03852.1; PID:g391867
 R;Wang, J.
 Proc. Natl. Acad. Sci. U.S.A. 90, 10230-10234, 1993
 A;Title: Mu opiate receptor: cDNA cloning and expression.
 A;Reference number: A48799; MUID:94052137
 A;Accession: A48799
 A;Status: preliminary; translated from GB/EMBL/DDBJ
 A;Molecule type: mRNA
 A;Residues: 1-244,'V',246-398 <WAN>
 A;Cross-references: GB:L20684; NID:g409149; PIDN:AAA41643.1; PID:g409150
 R;Thompson, R.C.; Mansour, A.; Akil, H.; Watson, S.J.
 Neuron 11, 903-913, 1993
 A;Title: Cloning and pharmacological characterization of a rat mu opioid receptor.
 A;Reference number: I58154; MUID:94059560

A;Accession: I58154
 A;Status: preliminary; translated from GB/EMBL/DDBJ
 A;Molecule type: mRNA
 A;Residues: 1-244,'V',246-398 <THO>
 A;Cross-references: GB:L22455; NID:g437671; PIDN:AAA16075.1; PID:g437672
 C;Genetics:
 A;Gene: MUOR1
 C;Superfamily: vertebrate rhodopsin
 C;Keywords: G protein-coupled receptor; transmembrane protein

Query Match 100.0%; Score 2111; DB 2; Length 398;
 Best Local Similarity 100.0%; Pred. No. 7.7e-170;
 Matches 398; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy	1	MDSSTGPGNTSDCS	DLAQASCS	PAPGS	WLNLSHVDGNQSDPCGLNRTGLGGNDSLCPQT	60
Db	1	MDSSTGPGNTSDCS	DLAQASCS	PAPGS	WLNLSHVDGNQSDPCGLNRTGLGGNDSLCPQT	60
Qy	61	GSPSMVTAITIMALYSIVCVVGLFGN	FLVMYVIVRYTKMKTATNIYIFNLALADALATST	120		
Db	61	GSPSMVTAITIMALYSIVCVVGLFGN	FLVMYVIVRYTKMKTATNIYIFNLALADALATST	120		
Qy	121	LPFQSVNYLMGTWPFGTILCKIVISIDYYNMFTSIFTLCTMSVDRYIAVCHPVKALDFRT	180			
Db	121	LPFQSVNYLMGTWPFGTILCKIVISIDYYNMFTSIFTLCTMSVDRYIAVCHPVKALDFRT	180			
Qy	181	PRNAKIVNVCNWILSSAIGLPVMFMATTKYRQGSIDCTLTFSHPTWYWENLLKICVFIFA	240			
Db	181	PRNAKIVNVCNWILSSAIGLPVMFMATTKYRQGSIDCTLTFSHPTWYWENLLKICVFIFA	240			
Qy	241	FIMPILIITVCYGLMILRLKSVRMLSGSKEKDRNLRRITRMVLVVVAVFIVCWTPIHIYV	300			
Db	241	FIMPILIITVCYGLMILRLKSVRMLSGSKEKDRNLRRITRMVLVVVAVFIVCWTPIHIYV	300			
Qy	301	IIKALITIPETTFQTVSWHFCIALGYTNSCLNPVLYAFLDENFKRCFREFCIPTSSSTIEQ	360			
Db	301	IIKALITIPETTFQTVSWHFCIALGYTNSCLNPVLYAFLDENFKRCFREFCIPTSSSTIEQ	360			
Qy	361	QNSTRVRQNTREHPSTANTVDRTNHQLENLEAETAPLP	398			
Db	361	QNSTRVRQNTREHPSTANTVDRTNHQLENLEAETAPLP	398			

SEQ ID NO:2

Sequence Comparison
A

RESULT 1

I56517

mu opioid receptor - rat

C;Species: Rattus norvegicus (Norway rat)

C;Date: 26-Jul-1996 #sequence_revision 26-Jul-1996 #text_change 20-Jun-2000

C;Accession: I56517; I57951; A49680; I52314; S34593; A48799; I58154

R;Bunzow, J.R.; Zhang, G.; Bouvier, C.; Saez, C.; Ronnekleiv, O.K.; Kelly, M.J.; Grandy, D.K.

J. Neurochem. 64, 14-24, 1995

A;Title: Characterization and distribution of a cloned rat mu-opioid receptor.

A;Reference number: I56517; MUID:95096825

A;Accession: I56517

A;Status: preliminary; translated from GB/EMBL/DDBJ

A;Molecule type: mRNA

A;Residues: 1-398 <RES>

A;Cross-references: EMBL:U02083; NID:g403573; PIDN:AAA70049.1; PID:g403574

R;Chen, Y.; Mestek, A.; Liu, J.; Hurley, J.A.; Yu, L.

Mol. Pharmacol. 44, 8-12, 1993

A;Title: Molecular cloning and functional expression of a mu-opioid receptor from rat brain.

A;Reference number: I57951; MUID:93341493

A;Accession: I57951

A;Status: preliminary; translated from GB/EMBL/DDBJ

A;Molecule type: mRNA

A;Residues: 1-398 <RE2>

A;Cross-references: GB:L13069; NID:g348250; PIDN:AAA41630.1; PID:g348251

R;Eppler, C.M.; Hulmes, J.D.; Wang, J.B.; Johnson, B.; Corbett, M.; Luthin, D.R.; Uhl, G.R.; Linden, J.

J. Biol. Chem. 268, 26447-26451, 1993

A;Title: Purification and partial amino acid sequence of a mu opioid receptor from rat brain.

A;Reference number: A49680; MUID:94075333

A;Accession: A49680

A;Status: preliminary

A;Molecule type: protein

A;Residues: 272-291 <EPP>

A;Experimental source: brain membranes

A;Note: sequence extracted from NCBI backbone (NCBIP:140841)

R;Sedqi, M.; Roy, S.; Ramakrishnan, S.; Elde, R.; Loh, H.H.

Biochem. Biophys. Res. Commun. 209, 563-574, 1995

A;Title: Complementary DNA cloning of a mu-opioid receptor from rat peritoneal macrophages.

A;Reference number: I52314; MUID:95251654

A;Accession: I52314

A;Status: preliminary

A;Molecule type: mRNA

A;Residues: 101-340 <SED>

A;Cross-references: GB:S77863; NID:g998526

A;Experimental source: Sprague Dawley, peritoneal macrophages

R;Fukuda, K.; Kato, S.; Mori, K.; Nishi, M.; Takeshima, H.

FEBS Lett. 327, 311-314, 1993

A;Title: Primary structures and expression from cDNAs of rat opioid receptor delta- and mu-subtypes.

A;Reference number: S34592; MUID:93351652
 A;Accession: S34593
 A;Molecule type: mRNA
 A;Residues: 1-244,'V',246-398 <FUK>
 A;Cross-references: GB:D16349; NID:g391866; PIDN:BAA03852.1; PID:g391867
 R;Wang, J.
 Proc. Natl. Acad. Sci. U.S.A. 90, 10230-10234, 1993
 A;Title: Mu opiate receptor: cDNA cloning and expression.
 A;Reference number: A48799; MUID:94052137
 A;Accession: A48799
 A;Status: preliminary; translated from GB/EMBL/DDBJ
 A;Molecule type: mRNA
 A;Residues: 1-244,'V',246-398 <WAN>
 A;Cross-references: GB:L20684; NID:g409149; PIDN:AAA41643.1; PID:g409150
 R;Thompson, R.C.; Mansour, A.; Akil, H.; Watson, S.J.
 Neuron 11, 903-913, 1993
 A;Title: Cloning and pharmacological characterization of a rat mu opioid receptor.
 A;Reference number: I58154; MUID:94059560
 A;Accession: I58154
 A;Status: preliminary; translated from GB/EMBL/DDBJ
 A;Molecule type: mRNA
 A;Residues: 1-244,'V',246-398 <THO>
 A;Cross-references: GB:L22455; NID:g437671; PIDN:AAA16075.1; PID:g437672
 C;Genetics:
 A;Gene: MUOR1
 C;Superfamily: vertebrate rhodopsin
 C;Keywords: G protein-coupled receptor; transmembrane protein

Query Match 100.0%; Score 2111; DB 2; Length 398;
 Best Local Similarity 100.0%; Pred. No. 7.7e-170;
 Matches 398; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

```

Qy      1 MDSSTGPGNTSDCSDPLAQASCSPAPGSWLNLSHVDGNQSDPCGLNRTGLGGNDSLCPQT 60
      |||
Db      1 MDSSTGPGNTSDCSDPLAQASCSPAPGSWLNLSHVDGNQSDPCGLNRTGLGGNDSLCPQT 60

Qy     61 GSPSMVTAITIMALYSIVCVVGLFGNFLVMYVIVRYTKMKTATNIYIFNLALADALATST 120
      |||
Db     61 GSPSMVTAITIMALYSIVCVVGLFGNFLVMYVIVRYTKMKTATNIYIFNLALADALATST 120

Qy    121 LPFQSVNYLMGTWPFGTILCKIVISIDYYNMFTSIFTLCTMSVDRIYAVCHPVKALDFRT 180
      |||
Db    121 LPFQSVNYLMGTWPFGTILCKIVISIDYYNMFTSIFTLCTMSVDRIYAVCHPVKALDFRT 180

Qy    181 PRNAKIVNVCNWILSSAIGLPVMFMATTKYRQGSIDCTLTFSHPTWYWENLLKICVFIFA 240
      |||
Db    181 PRNAKIVNVCNWILSSAIGLPVMFMATTKYRQGSIDCTLTFSHPTWYWENLLKICVFIFA 240

Qy    241 FIMPILIITVCYGLMILRLKSVRMLSGSKEKDRNLRRITRMVLVVVAVFIVCWTPIHIV 300
      |||
Db    241 FIMPILIITVCYGLMILRLKSVRMLSGSKEKDRNLRRITRMVLVVVAVFIVCWTPIHIV 300

Qy    301 IIKALITIPETTFQTVSWHFCIALGYTNSCLNPVLYAFLDENFKRCFREFCIPTSSSTIEQ 360
      |||
  
```

Db 301 IIKALITIPETTFQTVSWHFCIALGYTNSCLNPVLYAFLDENFKRCFREFCIPTSSSTIEQ 360

Qy 361 QNSTRVRQNTREHPSTANTVDRTNHQLENLEAETAPLP 398

|||||

Db 361 QNSTRVRQNTREHPSTANTVDRTNHQLENLEAETAPLP 398

Sequence Comparison B3

SEQID NO:7

RESULT 5
 HSU12569
 LOCUS HSU12569 1473 bp mRNA PRI 12-APR-1995
 DEFINITION Human mu opioid receptor variant (MOR1) mRNA, complete cds.
 ACCESSION U12569
 VERSION U12569.1 GI:607911
 KEYWORDS .
 SOURCE human.
 ORGANISM Homo sapiens
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
 Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
 REFERENCE 1 (bases 1 to 1473)
 AUTHORS Bare,L.A., Mansson,E. and Yang,D.
 TITLE Expression of two variants of the human mu opioid receptor mRNA
 in SK-N-SH cells and human brain
 JOURNAL FEBS Lett. 354 (2), 213-216 (1994)
 MEDLINE 95046336
 REFERENCE 2 (bases 1 to 1360)
 AUTHORS Wang,J.B., Johnson,P.S., Persico,A.M., Hawkins,A.L., Griffin,C.A.
 and Uhl,G.R.
 TITLE Human mu opiate receptor. cDNA and genomic clones, pharmacologic
 characterization and chromosomal assignment
 JOURNAL FEBS Lett. 338 (2), 217-222 (1994) Jan
 MEDLINE 94139928
 REFERENCE 3 (bases 1 to 1473)
 AUTHORS Bare,L.A.
 TITLE Direct Submission
 JOURNAL Submitted (24-JUL-1994) Lance A. Bare, Ohmeda, PPD, 100 Mountain
 Avenue, Murray Hill, NJ 07974, USA
 FEATURES Location/Qualifiers
 source 1. .1473
 /organism="Homo sapiens"
 /db_xref="taxon:9606"
 /cell_type="neuroblastoma, SK-N-SH"
 /tissue_type="brain"
 gene 197. .1375
 /gene="MOR1"
 CDS 197. .1375
 /gene="MOR1"
 /note="variant of human mu opioid receptor, Swiss-Prot
 Accession Number P35372"
 /codon_start=1
 /product="mu opioid receptor variant"
 /protein_id="AAB60354.1"
 /db_xref="GI:607912"
 /translation="MDSSAAPTNASNCTDALAYSSCSPAPSPGSWVNLSHLDGDLSDP
 CGPNRTDLGGRDSLCPPTGSPSMITAITIMALYSIVCVVGLFGNFLVMYVIVRYTKMK
 TATNIYIFNLALADALATSTLPFQSVNYLMGTWPFGTILCKIVISIDYYNMFTSIFTL
 CTMSVDRIYAVCHPVKALDFRTPRNAKIINVCNWILSSAIGLPVMFIATTKYRQGSID
 CTLTFSHPTWYWENLLKICVFIFAFIMPVLIITVCYGLMILRLKSVRMLSGSKEKDRN
 LRRITRMVLVVAVFIVCWTPIHIIYVIKALVTIPETTFQTVSWHFCIALGYTNSCLN"

PVLYAFLDENFKRCRFREFCIPTSSNIEQQNSTIRQNTDRDHPSTANTVDRTNHQVRSL
"

```
variation      314
                /gene="MOR1"
                /citation=[2]
                /replace="a"
                /product="human mu opioid receptor"
variation      347
                /gene="MOR1"
                /citation=[2]
                /replace="a"
                /product="human mu opioid receptor"
variation      379
                /gene="MOR1"
                /citation=[2]
                /replace="g"
                /product="human mu opioid receptor"
variation      817
                /gene="MOR1"
                /citation=[2]
                /replace="g"
                /product="human mu opioid receptor"
variation      895. .896
                /gene="MOR1"
                /citation=[2]
                /replace="cg"
                /product="human mu opioid receptor"
variation      1361. .1473
                /note="this variant's sequence differs from hMOR1
(GenBank
                Accession Number L25119) for these 113 nucleotides"
                /citation=[2]
BASE COUNT      363 a      415 c      326 g      369 t
ORIGIN
```

Query Match 83.6%; Score 1346.2; DB 97; Length 1473;
Best Local Similarity 99.3%; Pred. No. 0;
Matches 1362; Conservative 0; Mismatches 8; Indels 1; Gaps
1;

```
Qy      44 GCAGAGGAGAATGTCAGATGCTCAGCTCGGTCCCCTCCGCCTGACGCTCCTCTCTGTCTC 103
          |||
Db       1 GCAGAGGAGAATGTCAGATGCTCAGCTCGGTCCCCTCCGCCTGACGCTCCTCTCTGTCTC 60

Qy     104 AGCCAGGACTGGTTTCTGTAAGAAACAGCAGGAGCTGTGGCAGCGGCGAAAGGAAGCGGC 163
          |||
Db      61 AGCCAGGACTGGTTTCTGTAAGAAACAGCAGGAGCTGTGGCAGCGGCGAAAGGAAGCGGC 120

Qy     164 TGAGGCGCTTGGAACCCGAAAAGTCTCGGTGCTCCTGGCTACCTCGCACAGC-GTGCCCG 222
          |||
Db     121 TGAGGCGCTTGGAACCCGAAAAGTCTCGGTGCTCCTGGCTACCTCGCACAGCGGTGCCCG 180

Qy     223 CCCGGCCGTCAGTACCATGGACAGCAGCGCTGCCCCACGAACGCCAGCAATTGCACTGA 282
          |||
Db     181 CCCGGCCGTCAGTACCATGGACAGCAGCGCTGCCCCACGAACGCCAGCAATTGCACTGA 240
```


Qy 283 TGCCTTGGCGTACTCAAGTTGCTCCCCAGCACCCAGCCCCGGTTCTGGGTCAACTTGTC 342
 |||
 Db 241 TGCCTTGGCGTACTCAAGTTGCTCCCCAGCACCCAGCCCCGGTTCTGGGTCAACTTGTC 300
 |||
 Qy 343 CCACTTAGATGGCAACCTGTCCGACCCATGCGGTCCGAACCGCACCGACCTGGGCGGGAG 402
 |||
 Db 301 CCACTTAGATGGCGACCTGTCCGACCCATGCGGTCCGAACCGCACCGACCTGGGCGGGAG 360 Qy
 403 AGACAGCCTGTGCCCTCCGACCGGCAGTCCCTCCATGATCACGGCCATCACGATCATGGC 462
 |||
 Db 361 AGACAGCCTGTGCCCTCCAACCGGCAGTCCCTCCATGATCACGGCCATCACGATCATGGC 420
 |||
 Qy 463 CCTCTACTCCATCGTGTGCGTGGTGGGGCTCTTCGAAACTTCCTGGTCATGTATGTGAT 522
 |||
 Db 421 CCTCTACTCCATCGTGTGCGTGGTGGGGCTCTTCGAAACTTCCTGGTCATGTATGTGAT 480
 |||
 Qy 523 TGTCAGATACACCAAGATGAAGACTGCCACCAACATCTACATTTTCAACCTTGCTCTGGC 582
 |||
 Db 481 TGTCAGATACACCAAGATGAAGACTGCCACCAACATCTACATTTTCAACCTTGCTCTGGC 540
 |||
 Qy 583 AGATGCCTTAGCCACCAGTACCCTGCCCTTCCAGAGTGTGAATTACCTAATGGGAACATG 642
 |||
 Db 541 AGATGCCTTAGCCACCAGTACCCTGCCCTTCCAGAGTGTGAATTACCTAATGGGAACATG 600
 |||
 Qy 643 GCCATTTGGAACCATCCTTTGCAAGATAGTGATCTCCATAGATTACTATAACATGTTTAC 702
 |||
 Db 601 GCCATTTGGAACCATCCTTTGCAAGATAGTGATCTCCATAGATTACTATAACATGTTTAC 660
 |||
 Qy 703 CAGCATATTACCCCTCTGCACCATGAGTGTTGATCGATACATTGCAGTCTGCCACCCTGT 762
 |||
 Db 661 CAGCATATTACCCCTCTGCACCATGAGTGTTGATCGATACATTGCAGTCTGCCACCCTGT 720 Qy
 763 CAAGGCCTTAGATTTCCGTACTCCCCGAAATGCCAAAATTATCAATGTCTGCAACTGGAT 822
 |||
 Db 721 CAAGGCCTTAGATTTCCGTACTCCCCGAAATGCCAAAATTATCAATGTCTGCAACTGGAT 780
 |||
 Qy 823 CCTCTCTTCAGCCATTGGTCTTCTGTAAATGTTTCATGGCTACAACAAAATACAGGCAAGG 882
 |||
 Db 781 CCTCTCTTCAGCCATTGGTCTTCTGTAAATGTTTCATAGCTACAACAAAATACAGGCAAGG 840
 |||
 Qy 883 TTCCATAGATTGTACACTAACATTCTCTCATCCAACCTGGTACTGGGAAAACCTGCTGAA 942
 |||
 Db 841 TTCCATAGATTGTACACTAACATTCTCTCATCCAACCTGGTACTGGGAAAACCTGCTGAA 900
 |||
 Qy 943 GATCTGTGTTTTTCATCTTCGCCTTCATTATGCCAGTGCTCATCATTACCGTGTGCTATGG 1002
 |||
 Db 901 GATCTGTGTTTTTCATCTTCGCCTTCATTATGCCAGTGCTCATCATTACCGTGTGCTATGG 960
 |||
 Qy 1003 ACTGATGATCTTGCGCCTCAAGAGTGTCCGCATGCTCTCTGGCTCCAAAGAAAAGGACAG 1062
 |||
 Db 961 ACTGATGATCTTGCGCCTCAAGAGTGTCCGCATGCTCTCTGGCTCCAAAGAAAAGGACAG 1020
 |||
 Qy 1063 GAATCTTCGAAGGATCACCAGGATGGTGCTGGTGGTGGTGGTGTGTTTCATCGTCTGCTG 1122
 |||
 Db 1021 GAATCTTCGAAGGATCACCAGGATGGTGCTGGTGGTGGTGGTGTGTTTCATCGTCTGCTG 1080
 Qy 1123 GACTCCCATTCACATTTACGTCATCATTAAGCCTTGGTTACAATCCCAGAACTACGTT 1182
 |||
 Db 1081 GACTCCCATTCACATTTACGTCATCATTAAGCCTTGGTTACAATCCCAGAACTACGTT 1140
 |||

Qy 1183 CCAGACTGTTTCTTGGCACTTCTGCATTGCTCTAGGTTACACAAACAGCTGCCTCAACCC 1242
 |||
 Db 1141 CCAGACTGTTTCTTGGCACTTCTGCATTGCTCTAGGTTACACAAACAGCTGCCTCAACCC 1200

Qy 1243 AGTCCTTTATGCATTTCTGGATGAAAACCTCAAACGATGCTTCAGAGAGTTCTGTATCCC 1302
 |||
 Db 1201 AGTCCTTTATGCATTTCTGGATGAAAACCTCAAACGATGCTTCAGAGAGTTCTGTATCCC 1260

Qy 1303 AACCTCTTCCAACATTGAGCAACAAAACCTCCACTCGAATTCGTCAGAACACTAGAGACCA 1362
 |||
 Db 1261 AACCTCTTCCAACATTGAGCAACAAAACCTCCACTCGAATTCGTCAGAACACTAGAGACCA 1320

Qy 1363 CCCCTCCACGGCCAATACAGTGGATAGAACTAATCATCAGCTAGAAAATCT 1413
 |||
 Db 1321 CCCCTCCACGGCCAATACAGTGGATAGAACTAATCATCAGGTACGCAGTCT 1371

RESULT 1
 I56553

Sequence Comparison

SEQ ID NO: 8

mu opiate receptor - human
 N;Alternate names: MOR1 protein; opioid receptor mu
 C;Species: Homo sapiens (man)
 C;Date: 02-Jul-1996 #sequence_revision 02-Jul-1996 #text_change 19-May-2000
 C;Accession: I56553; A38991; S41075; S51215
 R;Mestek, A.; Hurley, J.H.; Bye, L.S.; Campbell, A.D.; Chen, Y.; Tian, M.;
 Liu, J.; Schulman, H.; Yu, L.
 J. Neurosci. 15, 2396-2406, 1995
 A;Title: The human mu opioid receptor: modulation of functional
 desensitization by calcium/calmodulin-dependent protein kinase and protein
 kinase C.
 A;Reference number: I56553; MUID:95198115
 A;Accession: I56553
 A;Status: nucleic acid sequence not shown; translated from GB/EMBL/DDBJ
 A;Molecule type: mRNA
 A;Residues: 1-400 <RES>
 A;Cross-references: GB:L29301; NID:g459831; PIDN:AAA73958.1; PID:g459832
 R;Wang, J.B.; Johnson, P.S.; Persico, A.M.; Hawkins, A.L.; Griffin, C.A.;
 Uhl, G.R.
 submitted to GenBank, August 1994
 A;Reference number: A38991
 A;Accession: A38991
 A;Status: translated from GB/EMBL/DDBJ
 A;Molecule type: mRNA
 A;Residues: 1-50,'N',52-233,'V',235-400 <WAN>
 A;Cross-references: GB:L25119; NID:g452072; PIDN:AAA20580.1; PID:g452073
 R;Wang, J.B.; Johnson, P.S.; Persico, A.M.; Hawkins, A.L.; Griffin, C.A.;
 Uhl, G.R.
 FEBS Lett. 338, 217-222, 1994
 A;Title: Human mu opiate receptor. cDNA and genomic clones, pharmacologic
 characterization and chromosomal assignment.
 A;Reference number: S41075; MUID:94139928
 A;Accession: S41075
 A;Status: nucleic acid sequence not shown
 A;Molecule type: mRNA
 A;Residues: 1-50,'N',52-400 <WA2>

R;Bare, L.A.; Mansson, E.; Yang, D.
 FEBS Lett. 354, 213-216, 1994
 A;Title: Expression of two variants of the human mu opioid receptor mRNA in SK-N-SH cells and human brain.
 A;Reference number: S51215; MUID:95046336
 A;Accession: S51215
 A;Status: preliminary
 A;Molecule type: mRNA
 A;Residues: 387-400 <BAR>
 C;Genetics:
 A;Gene: GDB:OPRM1
 A;Cross-references: GDB:137216; OMIM:600018
 A;Map position: 6q24-6q25
 C;Superfamily: vertebrate rhodopsin
 C;Keywords: G protein-coupled receptor; glycoprotein; transmembrane protein
 F;73-96/Domain: transmembrane #status predicted <TMM1>
 F;107-132/Domain: transmembrane #status predicted <TMM2>
 F;144-165/Domain: transmembrane #status predicted <TMM3>
 F;188-208/Domain: transmembrane #status predicted <TMM4>
 F;236-257/Domain: transmembrane #status predicted <TMM5>
 F;283-304/Domain: transmembrane #status predicted <TMM6>
 F;323-342/Domain: transmembrane #status predicted <TMM7>
 F;9,12,33,40,48/Binding site: carbohydrate (Asn) (covalent) #status predicted

Query Match 100.0%; Score 2122; DB 2; Length 400;
 Best Local Similarity 100.0%; Pred. No. 5.3e-169;
 Matches 400; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy	1	MDSSAAPTNASNCTDALAYSSCSPAPSPGSWVNL	SHLDGNLSDPCGPNRTDLGGRDSLCP	60
Db	1	MDSSAAPTNASNCTDALAYSSCSPAPSPGSWVNL	SHLDGNLSDPCGPNRTDLGGRDSLCP	60
Qy	61	PTGSPSMITAITIMALYSIVCVVGLFGNFLVMYVIVRYTKMKTATNIYIFNLALADALAT		120
Db	61	PTGSPSMITAITIMALYSIVCVVGLFGNFLVMYVIVRYTKMKTATNIYIFNLALADALAT		120
Qy	121	STLPFQSVNYLMGTWPFGTILCKIVISIDYYNMF	SIFTLCTMSVDRYIAVCHPVKALDF	180
Db	121	STLPFQSVNYLMGTWPFGTILCKIVISIDYYNMF	SIFTLCTMSVDRYIAVCHPVKALDF	180
Qy	181	RTPRNAKIINVCNWILSSAIGLPVMFMATTKYRQGSIDCTLTF	SHPTWYWENLLKICVFI	240
Db	181	RTPRNAKIINVCNWILSSAIGLPVMFMATTKYRQGSIDCTLTF	SHPTWYWENLLKICVFI	240
Qy	241	FAFIMPVLIITVCYGLMILRLKSVRMLSGSKEKDRNLRRITRMVLVVVAVFIVCWTPIHI		300
Db	241	FAFIMPVLIITVCYGLMILRLKSVRMLSGSKEKDRNLRRITRMVLVVVAVFIVCWTPIHI		300
Qy	301	YVIIKALVTIPETTFQTVSWHFCIALGYTNSCLNPVLYAFLDENFKRCFREFCIPTSSNI		360
Db	301	YVIIKALVTIPETTFQTVSWHFCIALGYTNSCLNPVLYAFLDENFKRCFREFCIPTSSNI		360
Qy	361	EQQNSTRIRQNTRDHPSTANTVDRTNHQLENLEAETAPLP		400
Db	361	EQQNSTRIRQNTRDHPSTANTVDRTNHQLENLEAETAPLP		400

SEQ ID NO: 17

Sequence Comparison D

RESULT 1

I56520

G protein-coupled receptor - rat

C;Species: Rattus norvegicus (Norway rat)

C;Date: 26-Jul-1996 #sequence_revision 26-Jul-1996 #text_change 20-Jun-2000

C;Accession: I56520; S46238; S43655; S46235; S45701; I52654

R;Lachowicz, J.E.; Shen, Y.; Monsma, F.J.

J. Neurochem. 64, 34-40, 1995

A;Title: Molecular cloning of a novel G protein-coupled receptor related to the opiate receptor family.

A;Reference number: I56520; MUID:95096849

A;Accession: I56520

A;Status: preliminary; translated from GB/EMBL/DDBJ

A;Molecule type: mRNA

A;Residues: 1-367 <RES>

A;Cross-references: EMBL:U07871; NID:g606802; PIDN:AAA69927.1; PID:g606803

R;Chen, Y.; Fan, Y.; Liu, J.; Mestek, A.; Tian, M.; Kozak, C.A.; Yu, L.

FEBS Lett. 347, 279-283, 1994

A;Title: Molecular cloning, tissue distribution and chromosomal localization of a novel member of the opioid receptor gene family.

A;Reference number: S46238; MUID:94307400

A;Accession: S46238

A;Status: preliminary

A;Molecule type: mRNA

A;Residues: 1-367 <CHE>

A;Cross-references: GB:L28144; NID:g496219; PIDN:AAC37661.1; PID:g496220

R;Fukuda, K.; Kato, S.; Mori, K.; Nishi, M.; Takeshima, H.; Iwabe, N.; Miyata, T.; Houtani, T.; Sugimoto, T.

FEBS Lett. 343, 42-46, 1994

A;Title: cDNA cloning and regional distribution of a novel member of the opioid receptor family.

A;Reference number: S43655; MUID:94215703

A;Accession: S43655

A;Status: preliminary

A;Molecule type: mRNA

A;Residues: 1-367 <FUK>

A;Cross-references: GB:D16438; NID:g456168; PIDN:BAA03908.1; PID:g533355

R;Bunzow, J.R.; Saez, C.; Mortrud, M.; Bouvier, C.; Williams, J.T.; Low, M.; Grandy, D.K.

FEBS Lett. 347, 284-288, 1994

A;Title: Molecular cloning and tissue distribution of a putative member of the rat opioid receptor gene family that is not a mu, delta or kappa opioid receptor type.

A;Reference number: S46235; MUID:94307401

A;Accession: S46235

A;Status: preliminary

A;Molecule type: mRNA

A;Residues: 1-347, 'A', 349-367 <BUN>

A;Cross-references: EMBL:U01913; NID:g487964; PIDN:AAA21025.1; PID:g487965

A;Note: the authors translated the codon GCG for residue 348 as Ser

R;Wang, J.B.; Johnson, P.S.; Imai, Y.; Persico, A.M.; Ozenberger, B.A.; Eppler, C.M.; Uhl, G.R.

FEBS Lett. 348, 75-79, 1994

A;Title: cDNA cloning of an orphan opiate receptor gene family member and its splice variant.

A;Reference number: S45701; MUID:94298959

A;Accession: S45701

A;Status: preliminary
 A;Molecule type: mRNA
 A;Residues: 1-331,'LL',334-367 <WAN>
 R;Wick, M.J.; Minnerath, S.R.; Lin, X.; Elde, R.; Law, P.Y.; Loh, H.H.
 Brain Res. Mol. Brain Res. 27, 37-44, 1994
 A;Title: Isolation of a novel cDNA encoding a putative membrane receptor with
 high homology to the cloned mu, delta, and kappa opioid receptors.
 A;Reference number: I52654; MUID:95182817
 A;Accession: I52654
 A;Status: preliminary; translated from GB/EMBL/DDBJ
 A;Molecule type: mRNA
 A;Residues: 1-367 <RE2>
 A;Cross-references: GB:L29419; NID:g510718; PIDN:AAC42041.1; PID:g510719
 C;Superfamily: vertebrate rhodopsin
 C;Keywords: G protein-coupled receptor; transmembrane protein

Query Match 100.0%; Score 1899; DB 2; Length 367;
 Best Local Similarity 100.0%; Pred. No. 1e-152;
 Matches 367; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy	1	MESLFPAPYWEVLYGSHFQGNLSLLNETVPHHLLLNASHSAFLPLGLKVTIVGLYLAVCI	60
Db	1	MESLFPAPYWEVLYGSHFQGNLSLLNETVPHHLLLNASHSAFLPLGLKVTIVGLYLAVCI	60
Qy	61	GLLGNCLVMYVILRHTKMKTATNIYIFNLALADTLVLLTLPFQGTDILLGFWPFGNALC	120
Db	61	GLLGNCLVMYVILRHTKMKTATNIYIFNLALADTLVLLTLPFQGTDILLGFWPFGNALC	120
Qy	121	KTVIAIDYYNMFTSTFTLTAMSVDRYVAICHPIRALDVRTSSKAQAVNVAIWALASVVG	180
Db	121	KTVIAIDYYNMFTSTFTLTAMSVDRYVAICHPIRALDVRTSSKAQAVNVAIWALASVVG	180
Qy	181	PVAIMGSAQVEDEEIECLVEIPAPQDYWGPVFAICIFLFSFIIPVLIISVCYSLMIRRLR	240
Db	181	PVAIMGSAQVEDEEIECLVEIPAPQDYWGPVFAICIFLFSFIIPVLIISVCYSLMIRRLR	240
Qy	241	GVRLSGSREKDRNLRRITRLVLVVAVFVGCWTPVQVFVLVQGLGVQPGSETAVAILRF	300
Db	241	GVRLSGSREKDRNLRRITRLVLVVAVFVGCWTPVQVFVLVQGLGVQPGSETAVAILRF	300
Qy	301	CTALGYVNSCLNPILYAFLDENFKACFRKFCCASSLHREMVSQSDRVRSIAKDVGLGCKTS	360
Db	301	CTALGYVNSCLNPILYAFLDENFKACFRKFCCASSLHREMVSQSDRVRSIAKDVGLGCKTS	360
Qy	361	ETVPRPA	367
Db	361	ETVPRPA	367

Sequence
Comparison
E

SEQ ID NO:2

LOCUS RATMORA 1586 bp mRNA ROD 04-AUG-1993
DEFINITION Rattus norvegicus mu opioid receptor mRNA, complete cds.
ACCESSION L13069
VERSION L13069.1 GI:348250
KEYWORDS mu opioid receptor.
SOURCE Rattus norvegicus Whole brain cDNA to mRNA.
ORGANISM Rattus norvegicus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae;
Rattus.
REFERENCE 1 (bases 1 to 1586)
AUTHORS Chen, Y., Mestek, A., Liu, J., Hurley, J.A. and Yu, L.
TITLE Molecular cloning and functional expression of a mu-opioid
receptor
from rat brain
JOURNAL Mol. Pharmacol. 44, 8-12 (1993) July
MEDLINE 93341493
FEATURES Location/Qualifiers
source 1. .1586
/organism="Rattus norvegicus"
/db_xref="taxon:10116"
/tissue_type="Whole brain"
CDS 210. .1406
/codon_start=1
/evidence=experimental
/label=RATMOR1
/product="mu opioid receptor"
/protein_id="AAA41630.1"
/db_xref="GI:348251"
/translation="MDSSTGPGNTSDCSDPLAQASCSAPAGSWLNLSHVDGNQSDPCG
LNRTGLGGNDLCPQTGSPSMVTAITIMALYSIVCVVGLFGNFLVMYVIVRYTKMKTA
TNIYIFNLALADALATSTLPFQSVNYLMGTWPFGTILCKIVISIDYYNMFTSIFTLCT
MSVDRIYAVCHPVKALDFRTPRNAKIVNVCNWILSSAIGLPVMFMATTKYRQGSIDCT
LTFSHPTWYWENLLKICVFIFAFIMPILIITVCYGLMILRLKSVRMLSGSKEKDRNLR
RITRMVLVVVAVFIVCWTPIHIIYVIAKALITIPETTFQTVSWHFCIALGYTNSCLNPV
LYAFLDENFKRCFREFCIPTSSSTIEQQNSTRVRQNTREHPSTANTVDRTNHQLENLEA
ETAPLP"
BASE COUNT 376 a 479 c 361 g 370 t
ORIGIN

alignment_scores:
Quality: 2111.00 Length: 398
Ratio: 5.304 Gaps: 0
Percent Similarity: 100.000 Percent Identity: 100.000

alignment_block:

US-08-305-518-2 x RATMORA ..

Align seg 1/1 to: RATMORA from: 1 to: 1586

```
1 MetAspSerSerThrGlyProGlyAsnThrSerAspCysSerAspProLe 17
  ||||||||||||||||||||||||||||||||||||||||||||
210 ATGGACAGCAGCACCAGGCCAGGGAACACCAGCGACTGCTCAGACCCCTT 259

17 uAlaGlnAlaSerCysSerProAlaProGlySerTrpLeuAsnLeuSerH 34
  ||||||||||||||||||||||||||||||||||||||||||||
260 AGCTCAGGCAAGTTGCTCCCCAGCACCTGGCTCCTGGCTCAACTTGTCCC 309

34 isValAspGlyAsnGlnSerAspProCysGlyLeuAsnArgThrGlyLeu 50
  ||||||||||||||||||||||||||||||||||||||||||||
310 ACGTTGATGGCAACCAGTCCGATCCATGCGGTCTGAACCGCACCGGGCTT 359

51 GlyGlyAsnAspSerLeuCysProGlnThrGlySerProSerMetValTh 67
  ||||||||||||||||||||||||||||||||||||||||||||
360 GCGGGAACGACAGCCTGTGCCCTCAGACCGGCAGCCCTTCCATGGTCAC 409

67 rAlaIleThrIleMetAlaLeuTyrSerIleValCysValValGlyLeuP 84
  ||||||||||||||||||||||||||||||||||||||||||||
410 AGCCATTACCATCATGGCCCTCTACTCTATCGTGTGTGTAGTGGGCTCT 459

84 heGlyAsnPheLeuValMetTyrValIleValArgTyrThrLysMetLys 100
  ||||||||||||||||||||||||||||||||||||||||||||
460 TCGGAACTTCCTGGTCATGTATGTGATTGTAAGATACACCAAATGAAG 509
101 ThrAlaThrAsnIleTyrIlePheAsnLeuAlaLeuAlaAspAlaLeuAl 117
  ||||||||||||||||||||||||||||||||||||||||||||
510 ACTGCCACCAACATCTACATTTTCAACCTTGCTCTGGCAGACGCCTTAGC 559

117 aThrSerThrLeuProPheGlnSerValAsnTyrLeuMetGlyThrTrpP 134
  ||||||||||||||||||||||||||||||||||||||||||||
560 GACCAGTACACTGCCCTTTCAGAGTGTCAACTACCTGATGGGAACATGGC 609

134 roPheGlyThrIleLeuCysLysIleValIleSerIleAspTyrTyrAsn 150
  ||||||||||||||||||||||||||||||||||||||||||||
610 CCTTCGGAACCATCCTCTGCAAGATCGTGATCTCAATAGATTACTACAAC 659

151 MetPheThrSerIlePheThrLeuCysThrMetSerValAspArgTyrIl 167
  ||||||||||||||||||||||||||||||||||||||||||||
660 ATGTTACCAGCATATTCACCCTCTGCACCATGAGCGTGGACCGCTACAT 709

167 eAlaValCysHisProValLysAlaLeuAspPheArgThrProArgAsnA 184
  ||||||||||||||||||||||||||||||||||||||||||||
710 TGCTGTCTGCCACCCAGTCAAAGCCCTGGATTTCCGTACCCCCCGAAATG 759

184 laLysIleValAsnValCysAsnTrpIleLeuSerSerAlaIleGlyLeu 200
  ||||||||||||||||||||||||||||||||||||||||||||
760 CCAAAATCGTCAACGTCTGCAACTGGATCCTCTTCTGCCATCGGTCTG 809
201 ProValMetPheMetAlaThrThrLysTyrArgGlnGlySerIleAspCy 217
  ||||||||||||||||||||||||||||||||||||||||||||
810 CCTGTAATGTTTCATGGCAACCACAAAATACAGGCAGGGGTCCATAGATTG 859

217 sThrLeuThrPheSerHisProThrTrpTyrTrpGluAsnLeuLeuLysI 234
  ||||||||||||||||||||||||||||||||||||||||||||
860 CACCCTCACGTTCTCCCAACCAACCTGGTACTGGGAGAACCTGCTCAAAA 909
```

SEQ ID NO:4

seq_documentation_block:

LOCUS RATMORA 1586 bp mRNA ROD 04-AUG-1993
DEFINITION Rattus norvegicus mu opioid receptor mRNA, complete cds.
ACCESSION L13069
VERSION L13069.1 GI:348250
KEYWORDS mu opioid receptor.
SOURCE Rattus norvegicus Whole brain cDNA to mRNA.
ORGANISM Rattus norvegicus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae;
Rattus.
REFERENCE 1 (bases 1 to 1586)
AUTHORS Chen,Y., Mestek,A., Liu,J., Hurley,J.A. and Yu,L.
TITLE Molecular cloning and functional expression of a mu-opioid
receptor
from rat brain
JOURNAL Mol. Pharmacol. 44, 8-12 (1993)
MEDLINE 93341493

FEATURES Location/Qualifiers
source 1. .1586
/organism="Rattus norvegicus"
/db_xref="taxon:10116"
/tissue_type="Whole brain"
CDS 210. .1406
/codon_start=1
/evidence=experimental
/label=RATMOR1
/product="mu opioid receptor"
/protein_id="AAA41630.1"
/db_xref="GI:348251"

/translation="MDSSTGPGNTSDCSDPLAQASCSPAPGSWLNLSHVDGNQSDPCG
LNRTGLGGNDSLCPQTGSPSMVTAITIMALYSIVCVVGLFGNFLVMYVIVRYTKMKTA
TNIYIFNLALADALATSTLPFQSVNYLMGTWPFGTILCKIVISIDYYNMFTSIFTLCT
MSVDRYIAVCHPVKALDFRTPRNAKIVNVCNWILSSAIGLPVMFMATTKYRQGSIDCT
LTFSHPTWYWENLLKICVFIFAFIMPILIITVCYGLMILRLKSVRLSGSKEKDRNLR
RITRMVLVVVAVFIVCWTPIHIVYIIKALITIPETTFQTVSWHFCIALGYTNSCLNPV
LYAFLDENFKRCFREFCIPTSSSTIEQQNSTRVRQNTREHPSTANTVDRTNHQLENLEA
ETAPLP"
BASE COUNT 376 a 479 c 361 g 370 t
ORIGIN

alignment_scores:

Quality: 1717.00 Length: 298
Ratio: 5.762 Gaps: 0
Percent Similarity: 100.000 Percent Identity: 100.000

alignment_block:

US-08-305-518-4 x RATMORA ..

Align seg 1/1 to: RATMORA from: 1 to: 1586

```

  1 MetArgSerGluProHisArgAlaTrpArgGluArgGlnProValProSe 17
  ||||||||||||||||||||||||||||||||||||||||||||||||
335 ATGCGGTCTGAACCGCACCGGGCTTGGCGGGAACGACAGCCTGTGCCCTC 384

 17 rAspArgGlnProPheHisGlyHisSerHisTyrHisHisGlyProLeuL 34
  ||||||||||||||||||||||||||||||||||||||||||||||||
385 AGACCGGCAGCCCTTCCATGGTCACAGCCATTACCATCATGGCCCTCTAC 434

 34 euTyrArgValCysSerGlyProLeuArgLysLeuProGlyHisValCys 50
  ||||||||||||||||||||||||||||||||||||||||||||||||
435 TCTATCGTGTGTGTAGTGGGCCTCTTCGGAAACTTCTGGTCATGTATGT 484

 51 AspCysLysIleHisGlnAsnGluAspCysHisGlnHisLeuHisPheGl 67
  ||||||||||||||||||||||||||||||||||||||||||||||||
485 GATTGTAAGATACACCAAAATGAAGACTGCCACCAACATCTACATTTTCA 534

 67 nProCysSerGlyArgArgLeuSerAspGlnTyrThrAlaLeuSerGluC 84
  ||||||||||||||||||||||||||||||||||||||||||||||||
535 ACCTTGCTCTGGCAGACGCCTTAGCGACCAGTACACTGCCCTTTCAGAGT 584

 84 ysGlnLeuProAspGlyAsnMetAlaLeuArgAsnHisProLeuGlnAsp 100
  ||||||||||||||||||||||||||||||||||||||||||||||||
585 GTCAACTACCTGATGGGAACATGGCCCTTCGGAACCATCCTCTGCAAGAT 634

101 ArgAspLeuAsnArgLeuLeuGlnHisValHisGlnHisIleHisProLe 117
  ||||||||||||||||||||||||||||||||||||||||||||||||
635 CGTGATCTCAATAGATTACTACAACATGTTTACCAGCATATTCACCCTCT 684

117 uHisHisGluArgGlyProLeuHisCysCysLeuProProSerGlnSerP 134
  ||||||||||||||||||||||||||||||||||||||||||||||||
685 GCACCATGAGCGTGGACCGCTACATTGCTGTCTGCCACCCAGTCAAAGCC 734

134 roGlyPheProTyrProProLysCysGlnAsnArgGlnArgLeuGlnLeu 150
  ||||||||||||||||||||||||||||||||||||||||||||||||
735 CTGGATTTCCGTACCCCCCGAAATGCCAAAATCGTCAACGTCTGCAACTG 784

151 AspProLeuPheCysHisArgSerAlaCysAsnValHisGlyAsnHisLy 167
  ||||||||||||||||||||||||||||||||||||||||||||||||
785 GATCCTCTCTTCTGCCATCGGTCTGCCTGTAATGTTTCATGGCAACCACAA 834

167 sIleGlnAlaGlyValHisArgLeuHisProHisValLeuProProAsnL 184
  ||||||||||||||||||||||||||||||||||||||||||||||||
835 AATACAGGCAGGGGTCCATAGATTGCACCCTCACGTTCTCCACCCAACC 884

184 euValLeuGlyGluProAlaGlnAsnLeuCysLeuTyrLeuArgPheHis 200
  ||||||||||||||||||||||||||||||||||||||||||||||||
885 TGGTACTGGGAGAACCTGCTCAAAATCTGTGTCTTTATCTTCGCTTTTCAT 934

201 HisAlaAspProHisHisHisCysValLeuArgProAspAspLeuThrTh 217
  ||||||||||||||||||||||||||||||||||||||||||||||||
935 CATGCCGATCCTCATCATCACTGTGTGTTACGGCCTGATGATCTTACGAC 984
```

217 rGlnGluArgSerHisAlaIleGlyLeuGlnArgLysGlyGlnGluSerA 234
 ||||||||||||||||||||||||||||||||||||||||||||
 985 TCAAGAGCGTTCGCATGCTATCGGGCTCCAAAGAAAAGGACAGGAATCTG 1034

 234 laGlnAspHisProAspGlyAlaGlyGlyArgGlyCysIleTyrArgLeu 250
 ||||||||||||||||||||||||||||||||||||||||||||
 1035 CGCAGGATCACCCGGATGGTGCTGGTGGTTCGTGGCTGTATTTATCGTCTG 1084

 251 LeuAspProHisProHisLeuArgHisHisGlnSerAlaAspHisAspSe 267
 ||||||||||||||||||||||||||||||||||||||||||||
 1085 CTGGACCCCATCCACATCTACGTCATCATCAAAGCGCTGATCACGATTC 1134

 267 rArgAsnHisIleSerAspArgPheLeuAlaLeuLeuHisCysPheGlyL 284
 ||||||||||||||||||||||||||||||||||||||||||||
 1135 CAGAAACCACATTTTCAGACCGTTTCCTGGCACTTCTGCATTGCTTTGGGT 1184

 284 euHisGluGlnLeuProGluSerSerSerLeuArgLeuProGly 298
 ||||||||||||||||||||||||||||||||||||||||||||
 1185 TACACGAACAGCTGCCTGAATCCAGTTCTTTACGCCTTCCTGGA 1228